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U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

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TRANSMITTAL LETTER TO THE UNITED STATES  
DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 U.S.C. 371

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U.S. APPLICATION NO. (If known, use 37 CFR 1.5)

09/622087

INTERNATIONAL APPLICATION NO.  
PCT/IB99/00702INTERNATIONAL FILING DATE  
10 March 1999PRIORITY DATE CLAIMED  
10 March 1998

## TITLE OF INVENTION

"METHOD AND SYSTEM FOR TRANSMITTING DATA"

## APPLICANT(S) FOR DO/EO/US

Rob PIETERSE; Edo Mark Alexander DE LEEUW &amp; Ronald R.G.L. VAN DER PUT

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
  - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☐ has been transmitted by the International Bureau.
  - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
  - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☐ have been transmitted by the International Bureau.
  - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
  - d. ☐ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98. ; PTO-1449; 6 references.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A **FIRST** preliminary amendment.  
☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information:

Int. Search Report; PCT Request;  
2 sheets formal drawings (Figs. 1-4);  
forms PCT/ISA/220; Ack. of Receipt of  
Documents filed with the IB as Receiving  
Office; Form PCT/IPEA/416.

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*Barbara Villani*  
Barbara Villani

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320 REC 0 PCT/IB99/00702

17. ☒ The following fees are submitted:**BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5)):**

Search Report has been prepared by the EPO or JPO ..... \$840.00

International preliminary examination fee paid to USPTO (37 CFR 1.482) ..... \$670.00

No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2)) ..... \$760.00

Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO ..... \$970.00

International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4) ..... \$ 96.00

**ENTER APPROPRIATE BASIC FEE AMOUNT =****CALCULATIONS PTO USE ONLY**

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Surcharge of \$130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).

\$

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE
Total claims	26 - 20 =	6	\$ 18.00
Independent claims	2 - 3 =	0	\$ 78.00
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ 260.00

\$ 108.00

\$

\$ 260.00

**TOTAL OF ABOVE CALCULATIONS =**

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\$

**SUBTOTAL =**

\$ 1,208.00

Processing fee of \$130.00 for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)).

\$

+

**TOTAL NATIONAL FEE =**

\$ 1,208.00

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property

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**TOTAL FEES ENCLOSED =**

\$ 1,208.00

Amount to be:  
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a. ☒ A check in the amount of \$ 1,208.00 to cover the above fees is enclosed.b. ☐ Please charge my Deposit Account No. \_\_\_\_\_ in the amount of \$ \_\_\_\_\_ to cover the above fees. A duplicate copy of this sheet is enclosed.c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 06-1378. A duplicate copy of this sheet is enclosed.**NOTE:** Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

FRISHAUF, HOLTZ, GOODMAN, LANGER & CHICK, P.C.  
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22,974

REGISTRATION NUMBER

LH: BV

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I hereby certify that this paper is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to the Asst. Commissioner for Patents, Washington, D.C. 20231

Patents, Washington, D.C. 20231  
*Barbara Villani*  
 Barbara Villani

Barbara Villani

In the event that this Paper is late filed, and the necessary petition for extension of time is not filed concurrently herewith, please consider this as a Petition for the requisite extension of time, and to the extent not tendered by check attached hereto, authorization to charge the extension fee, or any other fee required in connection with this Paper, to Account No. 06-1378.

extension fee, or any other fee required in connection with this Paper, to Account No. 06-1378.

No. 06-1378.

Asst. Commissioner for Patents  
Washington, D.C. 20231

Please amend the above-identified application as follows:

Claim 5, line 1, change "any of the preceding claims" to  
--any one of claims 1-4--.

Claim 6, line 1, change "any of the claims 1-5" to  
--any one of claims 1-4--.

Claim 8, line 1, change "any of the preceding claims" to  
--any one of claims 1-4--.

Claim 9, line 1, change "any of the preceding claims" to  
--any one of claims 1-4--;  
line 2, change "the" (first occurrence) to  
--a--.

Respectfully submitted,

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# Method and system for transmitting data.

The invention relates to a method for transmitting data from several first stations to a second station, the first stations each comprising at least a first transmitter, a first receiver and a first clock and the second station comprising at least a second transmitter, a second receiver and a second clock, the method comprising:

- transmitting, in a synchronisation time slot of a time window, a synchronisation message from the second station to the first stations,
- transmitting, in a selection time slot of the time window, selection messages from the second station to selected first stations,
- transmitting, in response time slots of the time window, data from selected first stations to the second station.

Such a method is disclosed in the American patent specification 5,297,144.

A method of the above type is applied, e.g., for transmitting data, such as measurement data, from several dispersed local stations (first stations) to a central station (second station). In doing so, the second station, which collects the data from the first stations and/or passes it on to a further station, may have the first stations transmit data by polling. The transmission may take place wirelessly by way of, e.g., a radio link, but also by way of a cable. To the data, there may be added an identification of the transmitting first station. The drawback of such a method is, firstly, that each first station must be continuously capable of receiving the call signal (selection signal) and of transmitting data. In other words: the transmitter and receiver of the first station should be permanently activated. For battery-powered first stations, however, the problem arises that as a result the battery may be exhausted relatively fast.

A method of the above type secondly has the drawback that, in supplement of the data, there should always be transmitted the identification of the transmitting first station, which requires additional transmission time and therefore additional energy.

In the above American patent specification, a method is proposed in which the first stations wait for a selection message (call message). Immediately after receiving a selection message intended for the station in question, the response time slot commences in which the first station transmits its data. In

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Although the time window may have a fixed, predetermined

duration, the duration of the actual time window is advantageously transmitted from the second station in the synchronisation time slot to the first stations. As a result, it is possible to adjust the duration of each time window to the number of first stations to be selected, i.e., the amount of data to be transmitted.

The invention further provides a system for transmitting data, comprising:

- several first stations, each having a first transmitter, a first receiver, a first control unit and a first clock,
  - a second station having a second transmitter, a second receiver, a second control unit and a second clock,
- the first stations being arranged for synchronising their clocks based on a synchronisation message transmitted by the second station, and transmitting data as a function of selection messages transmitted by the second station, which system, in accordance with the invention, is characterised in that the second station is arranged for consecutively transmitting the selection messages, and that the first stations are arranged for deactivating their receivers in response to the absence of a corresponding selection message. In addition, the invention provides a measuring station (first station) and a collection station (second station) for application in such a system.

The invention will be explained in greater detail hereinbelow by reference to the figures.

FIG. 1 schematically shows a system for transmitting data, to which the present invention may be applied.

Figures FIG. 2A and 2B schematically show a first station and the second station of the system of FIG. 1, respectively.

Figures FIG. 3 and 4 schematically show time windows for transmitting data in accordance with several embodiments of the present invention.

The system schematically shown in FIG. 1 and shown only by way of example for transmitting data, comprises first stations 1a, 1b, 1c, 1d and a second station 2. Although in FIG. 1 four first stations are shown, basically any number of first stations may be applied. The first stations 1a-1d which, e.g., occupy fixed positions, may form, e.g., measurement stations for measuring meteorological or geological data. The second station 2 may comprise

a fixed station, but may also be formed by, e.g., a satellite.

In FIG. 2A, a first station 1 is schematically shown in greater detail. The first station 1 comprises a transmitter 11, a receiver 12, a control apparatus 13, an antenna 14, a battery 15, a clock 16 and a measuring apparatus 17, which are mutually coupled. The measuring apparatus 17 may be provided with sensors (not shown) and a data buffer. The clock 16 may be, e.g., a clock for universal time (e.g., GMT [= Greenwich Mean Time]), or a synchronised counter.

The second station 2 schematically shown in FIG. 2B comprises a transmitter 21, a receiver 22, a processing unit 23, an antenna 24, a power supply 25 and a clock 26, which are mutually coupled. The processing unit 23, which may be formed by, e.g., a microprocessor, may serve both for processing data (e.g., measurement data transmitted from the first stations) and for controlling the second station 2.

The transmitters 11 and 21, and the receivers 12 and 22, may be commercially available components which are arranged, e.g., for wireless transmission by way of a suitable radio frequency which may also lie in a frequency band for wireless telephony (e.g., GSM [= Global System for Mobile communications]). Basically, use may be made of one frequency for both the transmitter and the receiver (half duplex), but it is also possible to use different frequencies for the transmitter and the receiver.

In the system of FIG. 1, data is to be transmitted from the first stations 1a-1d to the second station. In accordance with the invention, the second (central) station 2 unequivocally allots time slots to the first stations 1a-1d for this purpose within a time window. This will be explained in greater detail by reference to the figures FIG. 3 and 4.

In accordance with a first embodiment, the time window 4 schematically shown in FIG. 3 comprises four consecutive response time slots 8a, 8b, 8c and 8d, which start at the times T2, T3, T4 and T5, respectively. In the embodiment shown, each of the time slots 8a-8d is allotted to one of the first stations 1a-1d of FIG. 1. Here, the order of allocation is basically random. The allocation itself takes place beforehand, in an initialisation process, the receivers of all first stations being active and the second station transmitting, e.g., an identification to each first station, as well



as the time limits (e.g., T3 and T4) of the allotted time slot in question. The initialisation process is carried out on the basis of the time slots 5 and 6. In the synchronisation time slot 5, which starts at time T0 (= start of the time window 4), the second station 2 transmits a synchronisation message SYN to all first stations. In the selection time slot 6, which starts at time T1, the second station transmits a selection message SEL to selected first stations. This will be explained in greater detail later.

In accordance with the invention, the first stations in their allotted time slots sequentially transmit data to the second station. In this connection, the first station 1a transmits, e.g., in the time slot 8a, i.e., between times T2 and T3. Subsequently, the first station 1b transmits in time slot 8b, etc. In this manner, the transmitter (11) of the first station 1a need be active and consume energy only between times T0 and T1, since said transmitter may be switched off at time T1. Possibly, the transmitter may be switched off earlier if the end of the data to be transmitted is reached prior to the end of the time slot. If the first station in question need not transmit any data, it is possible for the transmitter not to be switched on at all. Periodically, however, the transmitter may be activated to report the correct functioning of the first station.

In accordance with the invention, the receivers (12) of the first stations may be switched off during or after the selection time slot 6, i.e., no later than time T2. This will be explained in greater detail later.

Preferably, the time window 4 is cyclically repeated, the time slot 5 of the next time window following the time slot 8d (T6=T0'). As a result, in the exemplary embodiment shown in FIG. 3 each first station permanently has at its disposal one-fourth part of the response time slots 8 of the time window 4 for transmitting data, so that each transmitter is inactive for more than three-quarters of the duration of time window 4. The receivers of the first stations are preferably switched off during the response time slots 8.

At the start of the time window 4, a synchronisation message SYN and a selection message SEL are transmitted. On the basis of the synchronisation message SYN, the first clocks 16 are synchronised with the second clock 26; see figures FIG. 2A and 2B. For this purpose, in each time window the receivers of the first stations are

on during the synchronisation time slot 5. As a rule, it will not be necessary to transmit a synchronisation message SYN in each time window 4. It is therefore possible to carry out the method according to the invention with at least a few time windows in which no  
 5 synchronisation message SYN is present, and possibly no synchronisation time slot 5.

In selection time slot 6, the second station subsequently transmits selection or request messages SEL. Said selection messages each contain a first identification ("address") ID for indicating a  
 10 specific first station, and a second identification ("time") TR for indicating an allotted response time slot. The first identification ("address") may be a number which is permanently allotted to a first station. The second identification preferably is a start time (e.g., T4) of a response time slot 8. The start time is advantageously  
 15 expressed as a time difference with respect to start time T0 of the time window. Possibly, the second identification may also contain an end time (e.g., T5) of the time slot in question, or the number of bytes to be transmitted. The amount of selection information to be transmitted may be restricted, however, by laying down the duration  
 20 of the response time slots in advance, so that there need not be transmitted any end time or number of data units.

The selection messages are consecutively transmitted in the single selection time slot 6. In this time slot 6, therefore, there on the receivers of all first stations having data to be transmitted  
 25 are on. As soon as an identification of a time slot is received by the station in question, it may switch off its receiver. If the identifications are transmitted in numerical order, the first station having, e.g., the highest number, will have to keep its receiver activated the longest. In order to be able to distribute the energy  
 30 consumption of the receivers proportionally among the first stations, the table (or identifications of first stations having allotted time slots, respectively) is run through and transmitted alternately in ascending and descending order. It is also possible each time to run through said identifications in another, preferably randomly  
 35 determined, order.

In response to the selection or request message (SEL), the first station in question transmits data to the second station in the response time slot allotted to it.

In this embodiment, therefore, the receiver of a first station need only be activated during selection time slot 6. The receivers of the first stations are preferably activated during each synchronisation time slot 5 as well. Such is not necessary, however, if the duration of the time window 4 does not change and the first clocks are sufficiently accurate.

A first station may optionally transmit an overflow message M, indicating that more data is present than is capable of being transmitted in one response time slot. In such case, said overflow message M is included in the data field of the time slot 8 in question. If there is an overflow message M present in a response time slot, the first station in question will have the opportunity, if possible, to transmit supplementary data. Such may be realised in several ways.

The second station will preferably prepare a table having first stations which did transmit an overflow message M, a selection message SEL being transmitted in a subsequent time window (4') only to those first stations which did transmit an overflow message M in the preceding time window. In this connection, other and/or supplementary time slots may possibly be allotted to said first stations.

In the embodiment of FIG. 4, there are added command time slots 7 to the time window 4, namely, between the selection time slot 6 and the first response time slot 8a. In the command time slots 7 - the four command time slots 7a-7d in the embodiment shown - the second station transmits commands COM to the selected first stations.

In this embodiment, the second identifications ("times") TR of the selection messages do not indicate the response time slots 8, but rather the command time slots 7. In other words, based on the selection messages SEL each first station may determine whether, and if so when, it will receive a command message COM. First stations which are not selected may switch off their receiver for the remainder of the time window in question.

The command messages COM preferably contain a first identification ("address") ID indicating a first respective station and a second identification ("time") TR indicating a response time slot 8. In this respect, the command messages COM correspond to the selection messages SEL of the first embodiment. The command messages

COM, however, may also contain a command (instruction) for the first station in question. Such a command, e.g., instructs a measuring apparatus connected to the first station to carry out an operation, or changes the settings of the first station itself.

5       The first identification ("address") ID containing a command message COM may include a subaddress indicating a part (e.g., a connected measuring apparatus) of the first station, and/or a superaddress indicating several first stations. In the latter case, a supplementary address may be transmitted to a first station,  
10       enabling a separate identification within the group indicated by the superaddress.

By way of the command time slots and the indirection offered thereby, a very flexible transmission of commands and allocation of response time slots are possible. Still, the additional energy  
15       consumption of the first stations is minimal, since they need to activate their receivers only during the command time slot allocated to them.

It will be understood that in this embodiment, too, energy is saved in the first stations, since the transmitters and/or receivers  
20       of the first stations may be inactive most of the time.

An even more flexible method is provided if the length of the time window 4 is variable. For this purpose, the synchronisation message SYN, which is transmitted in the synchronisation time slot 5, may also contain an indication of the end (T10 in FIG. 4) of the time  
25       window. Said indication preferably has the form of a time difference with respect to start time T0.

Although in the above embodiments it was assumed that in each time window 4 a response time slot 8 is allotted to all first stations, such need not be the case at all and the second station (in  
30       a specific time window) may allot a response time slot only to one or a few first stations. Possibly, the first stations, which are not selected in a specific time window, may have their turn in a subsequent time window.

A major advantage of the present invention is the fact that the  
35       number of first stations is substantially unlimited. By adaptively allotting, in each time window, time slots to first stations, it is possible, with a single second station, to transmit data from a substantially arbitrary number of first stations.

In the method according to the invention, the second station therefore first broadcasts a synchronisation message intended for all first stations, subsequently selection messages intended for selected first stations, possibly also command messages intended only for  
5 selected first stations, to eventually receive data from the selected first stations in the time slots allotted to them. On the basis of the selection messages, the first stations switch off their receiver or not. They are preponderantly passive, but may pass along an overflow message along with their data, indicating that they have  
10 more data to transmit. Also, the transmission of data by a first station in the time slot allotted thereto serves as a confirmation of receipt of the selection and/or command message in question. The first stations, therefore, need not transmit any confirmation or reservation message.

15 It will be understood by those skilled in the art that the invention is not limited to the embodiments shown, and that many modifications and amendments are possible without departing from the scope of the invention.

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CLAIMS

1. Method for transmitting data from several first stations (1a-1n) to a second station (2), the first stations each comprising at least a first transmitter (11), a first receiver (12) and a first clock (16), and the second station (2) comprising at least a second transmitter (21), a second receiver (22) and a second clock (26), the method comprising:

- transmitting, in a synchronisation time slot (5) of a time window (4), a synchronisation message (SYN) from the second station (2) to the first stations (1),
- transmitting, in a selection time slot (6) of the time window (4), selection messages (SEL) from the second station (2) to selected first stations (1),
- transmitting, in response time slots (8) of the time window (4), data from selected first stations (1) to the second station (2),

characterised by transmitting, in a single selection time slot (6), the selection messages (SEL) and by deactivating, by each first station (1), its receiver (12) if no respective selection message (SEL) has been transmitted.

2. Method according to claim 1, wherein the deactivation takes place at the end of the selection time slot (6).

3. Method according to claim 1, wherein the selection messages (SEL) are transmitted in a predetermined sequence and the deactivation takes place based on the sequence.

4. Method according to claim 3, wherein several sequences are applied and a sequence indication of the sequence to be applied in a specific time window (4) is transmitted by the second station (2) in the synchronisation time slot (5).

5. Method according to any of the preceding claims, wherein the selection messages (SEL) each contain a time indication (TR) of the response time slots (8).

6. Method according to any of the claims 1-5, wherein the selection messages (SEL) each contain a time indication (TC) of command time slots (7) following the selection time slot (6) for transmitting command messages (COM) from the second station (2) to the selected first station (1).
7. Method according to claim 6, wherein a command message (COM) contains a time indication (TR) of a response time slot (8).
8. Method according to any of the preceding claims, wherein the transmitter (11) of each first station (1) is activated only during the respective response time slot (8).
9. Method according to any of the preceding claims, wherein the duration of the current time window (4) is transmitted to the first stations (1) by the second station (2) in the synchronisation time slot (5).
10. System for transmitting data, comprising:
- several first stations (1), each having a first transmitter (11), a first receiver (12), a first control unit (13) and a first clock (16),
  - a second station (2) having a second transmitter (21), a second receiver (22), a second control unit (23) and a second clock (26),
- the first stations (1) being arranged for synchronising their clocks (16) based on a synchronisation message (SYN) transmitted by the second station (2), and transmitting data as a function of selection messages (SEL) transmitted by the second station (2),
- characterised in that
- the second station (2) is arranged for consecutively transmitting the selection messages (SEL), and that the first stations (1) are arranged for deactivating their receivers (12) in response to the absence of a corresponding selection message (SEL).

## ABSTRACT

A method for transmitting data from several first stations (1a-1n), such as measuring stations, to a second station (2), such as a

5 data-collection station, comprises:

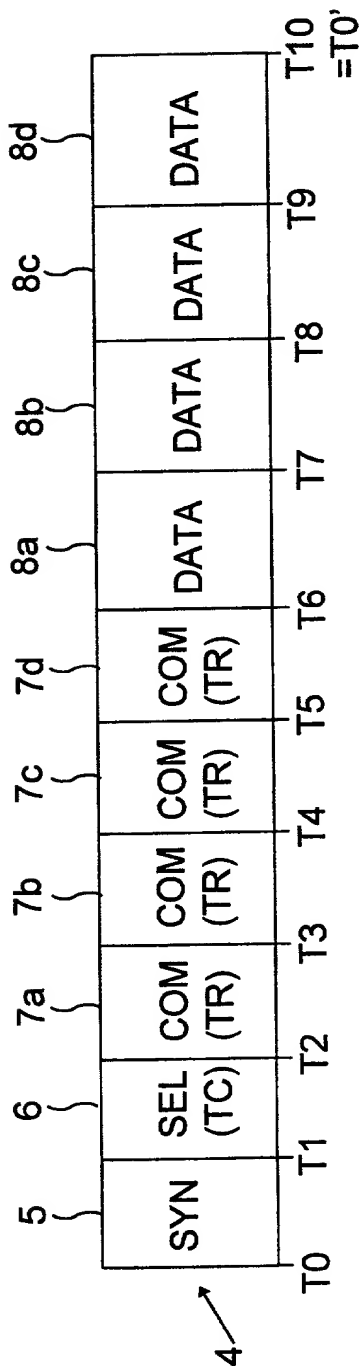
- transmitting, in a synchronisation time slot (5) of a time window (4), a synchronisation message (SYN) from the second station (2) to the first stations (1),
  - transmitting, in a selection time slot (6) of the time window (4), selection messages (SEL) from the second station (2) to selected first stations (1),
  - transmitting, in response time slots (8) of the time window (4), data from selected first stations (1) to the second station (2).
- 15 In order to save energy in the first stations, the selection messages (SEL) are transmitted in one single selection time slot (6) and its receiver (12) is switched off by each first station (1) if no respective selection message (SEL) has been transmitted.

20 FIG. 3





**FIG. 3**



**FIG. 4**

**APPLICATION FOR UNITED STATES LETTERS PATENT**

PCT Declaration and Power of Attorney (35 U.S.C. 371(c)(4))

PCT Application - United States Designated Office

As a below named inventor, I declare that:

My residence, post office address and citizenship are as stated below next to my name; I believe that I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

**METHOD AND SYSTEM FOR TRANSMITTING DATA**

described and claimed in International Application number PCT/IB99/00702 filed March 10, 1999  
and, if it was amended, as amended on

I have reviewed and understand the contents of said specification, including claims.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR §1.56.

I claim priority benefits under 35 USC §119 of: (i) any foreign application(s) for patent or inventor's certificate listed below; or (ii) any United States provisional application(s) listed below; and have also identified below any foreign application(s) for patent or inventor's certificate, or PCT international application having a filing date before that of the application(s) on which priority is claimed.

COUNTRY	APPLICATION NUMBER	DATE (day, month, year)	PRIORITY CLAIMED
Netherlands	1008548	10 March 1998	yes <u>X</u> no _____
			yes _____ no _____


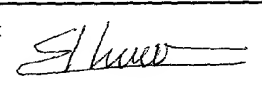
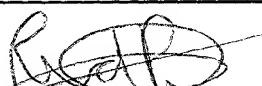
I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

I appoint the following attorneys to prosecute this application and to transact all business in the U.S. Patent & Trademark Office connected therewith: Leonard Holtz, Reg. No. 22,974; Herbert Goodman, Reg. No. 17,081; Thomas Langer, Reg. No. 27,264; Marshall J. Chick, Reg. No. 26,853; Richard S. Barth, Reg. No. 28,180; Douglas Holtz, Reg. No. 33,902; and Robert P. Michal, Reg. No. 35,614.

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